



## **Bruker Solutions for Feed and Forage Testing**

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Bruker Optics



## Content

- Introduction of Bruker
- Bruker solution for feed and forage testing
- Advantages of Bruker FTNIR

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## Bruker Companies

**Bruker BioSpin**  
NMR, MRI, EPR Spectrometers



**Bruker AXS**  
XRD, SCD, XRF Spectrometers



**Bruker Daltonics**  
Mass Spectrometers



**Bruker Optics**  
Infrared and Raman Spectrometers



\* Bruker BioSciences Corporation (NASDAQ: BRKR)



## Bruker Optics

**Bruker Optics have two major production sites**

*Bruker Optik GmbH  
in Ettlingen, Germany*



*Production*



*Bruker Optics Inc  
in The Woodlands, TX*



*Final testing*

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## Bruker Solution for Feed Industry

**MPA**



- Easy operation
- Compact and rugged
- Ethernet connectivity
- 21 CFR Part 11 compliance
- High sensitivity InGaAs and PbS detectors, optional: Si detector
- Spectral Range:  
12,800 - 3,600  $\text{cm}^{-1}$

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## Bruker Solution for Feed Industry

**MPA**

### **MPA - the custom-made instrument**

Each customer buys exactly the instrument that matches his/her application.  
There is no need to purchase anything that is not wanted or needed



MPA basic configuration



MPA fully equipped

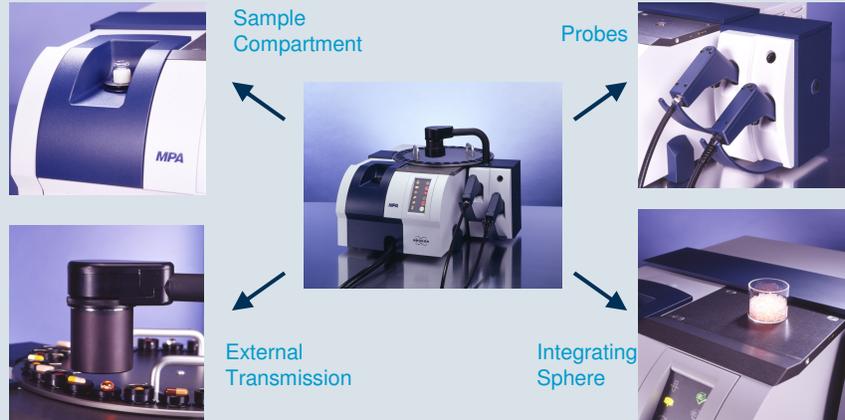
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## Bruker Solution for Feed Industry

**MPA**

All in one with MPA



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## Bruker Solution for Feed Industry

**MPA**



- **MPA** with two channels are recommended for feeds and feed ingredients analysis
  - Sample compartment for liquid samples: e.g. incoming fats and oils
  - Integrating sphere coupled with rotating cup for solid samples

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## Bruker Solution for Feed Industry

### Matrix-I



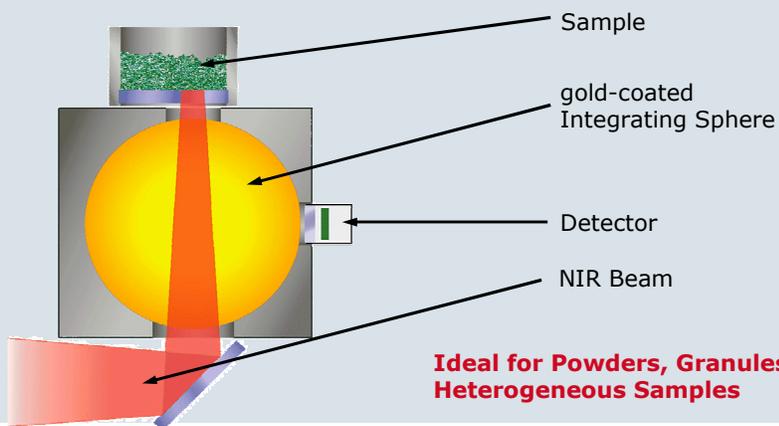
- **Matrix-I** for solid sample only
- Based on the Optical Modul of MATRIX-F
- Robust, rugged and waterproof
- Fixed, gold-coated Integrating Sphere
- Vibration and Temperature insensitive
- At-line and In-line Installation
- Used for heterogeneous and coarse-grained Materials

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## Bruker Solution for Feed Industry

### Integrating Sphere



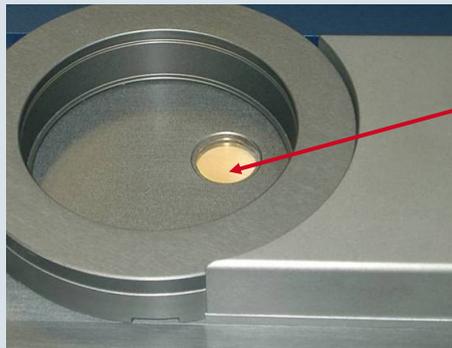
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## Bruker Solution for Feed Industry



- Rotating device and sampling cups for integrating sphere
  - Quartz cup
    - Diameter 50mm
    - Diameter 97mm
  - Glass beaker
  - Petri dish

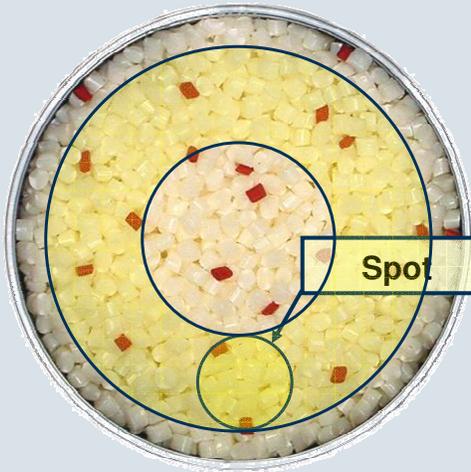
## Bruker Solution for Feed Industry



- **Window of Integrating Sphere  $\varnothing$  15 mm**



## Bruker Solution for Feed Industry



Accessory	Area	Factor
Integrating Sphere	1.1 cm <sup>2</sup>	1
Small Spinner	6.8 cm <sup>2</sup>	6
Large Spinner	19.6 cm <sup>2</sup>	18

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## Bruker Solution for Feed Industry

### Matrix-F duplex: on-line monitoring



- The only NIR system worldwide which can measure liquids and solids in transmission and reflection and do at the same time contact-less measurements with just one instrument using light fiber technology
- Simultaneous coupling of up to 6 sampling probes: for solids and for liquids
- Compact and portable
- Robust and insensitive to vibration
- Standard Dustproof (NEMA 2) or optional Waterproof (NEMA 4) housing

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## Advantages of Bruker FTNIR



### **ROCKSOLID® Interferometer**

- **non-sensitive to Vibrations**
- **non-sensitive to Temperature Fluctuations**
- **highest Repeatability: 0.01 cm<sup>-1</sup>**
- **highest Accuracy: 0.1cm<sup>-1</sup>**
- **highest Resolution: 2 cm<sup>-1</sup>**

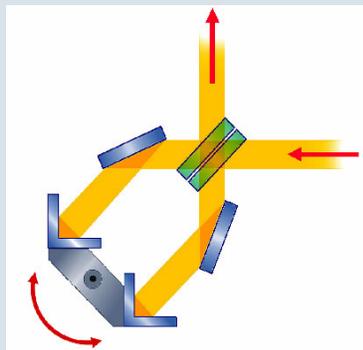
and

**permanently aligned!**

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## Advantages of Bruker FTNIR



### **ROCKSOLID® Interferometer**

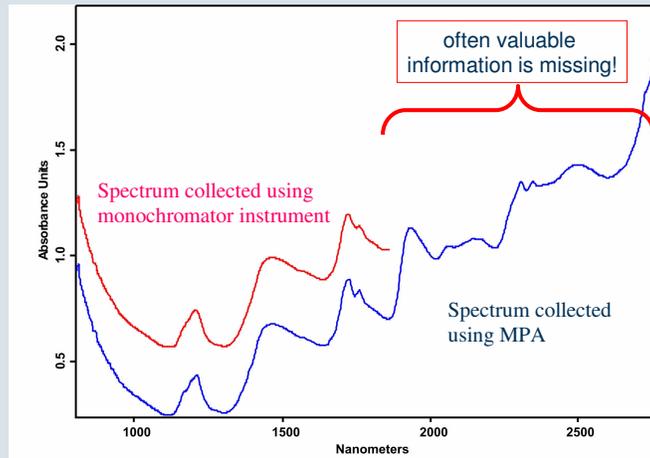
### **Advantages of Bruker FTNIR Technology**

- No Slits
  - High light throughput
  - High optical resolution
- Robust set up
  - Controlled by laser device
- Wavelength Accuracy
  - More than one magnitude better than dispersive monochromator systems
- Direct transferability
  - Between FT systems, no standardization needed

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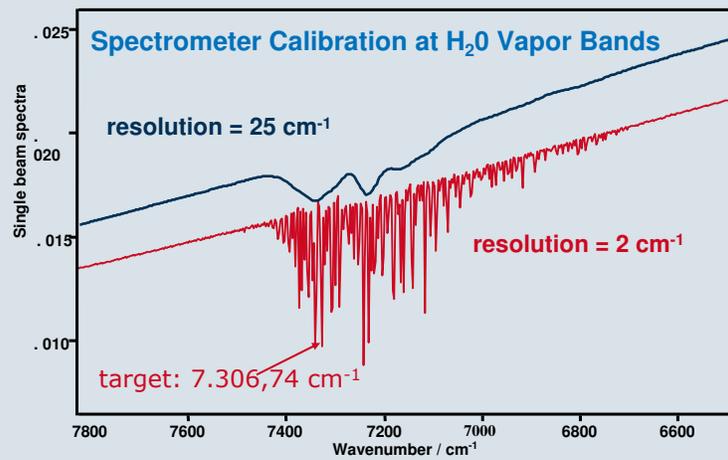
## Advantages of Bruker FTNIR

### Full NIR Range Spectrum



## Advantages of Bruker FTNIR

### High Resolution





## Advantages of Bruker FTNIR

### Why do we need high resolution?

- **Not for solving application questions (mostly  $8\text{cm}^{-1}$  is enough)**
- **But for measuring the x-axis accuracy of the instrument**
  - Wavelength repeatability:  $0.04\text{ cm}^{-1}$
  - Wavelength accuracy:  $0.1\text{ cm}^{-1}$
- **X-axis stability is the key for**
  - Permanently reliable predictions
  - Calibration transfer

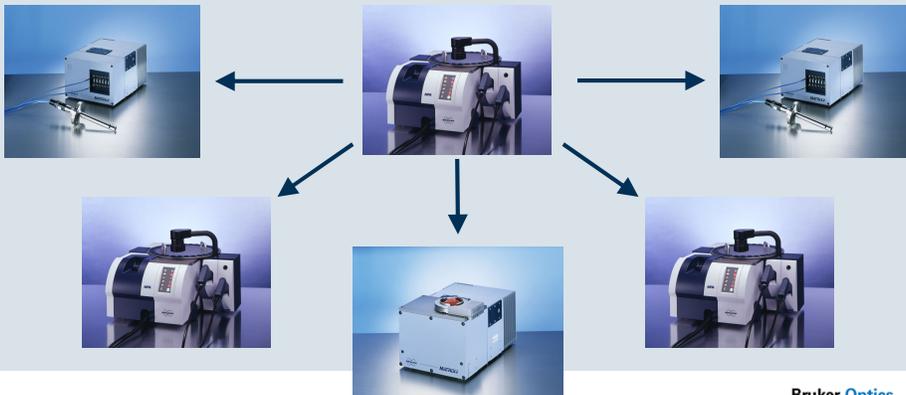
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## Advantages of Bruker FTNIR

### Calibration Transfer:

The exceptional performance of the instrument ensures a smooth calibration transfer not only to other *MPA* instruments but also to the *MATRIX* process spectrometers.



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## Advantages of Bruker FTNIR



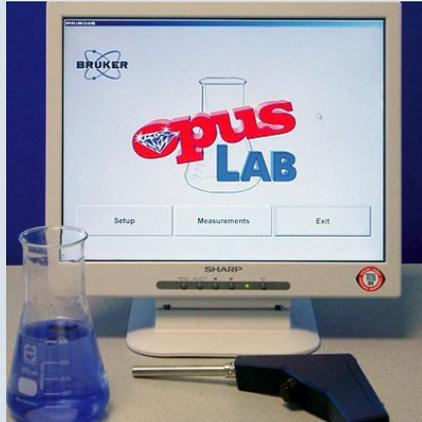
### Easy Operation

- Customizable workspaces
- Easy measurement option
- Setup of instrument with a few mouse clicks
- Displace informs the user about instrument status and measurement results

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## Advantages of Bruker FTNIR



### Easy Operation

- The user-friendly OPUS/LAB software is ideal for the daily routine analysis
- OPUS/QUANT software provides accurate quantitative analysis of complex mixtures
- OPUS/IDENT is an intuitive and powerful software package for the identification of substances
- IQ/OQ/PQ support
- 21 CFR Part 11 and GMP compliance

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## Advantages of Bruker FTNIR



### Plug and Play Connectivity:

- The Ethernet connection allows the remote operation and diagnosis of the Bruker NIR systems:
  - In the local network
  - via the world wide web
  - No special I/O-Unit necessary

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## Advantages of Bruker FTNIR



### Easy Maintenance

- ❑ Plug and Play Setup via Ethernet
- ❑ Sealed, Desiccated, Permanently Aligned Optics and Interferometer.
- ❑ User-Replaceable Pre-Aligned NIR Source
- ❑ User-Replaceable Pre-Aligned HeNe Laser
- ❑ Separately Sealed Electronics Chamber
- ❑ Modular Components Throughout

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## Bruker Solution for Feed Industry

### Calibration

- Capable of transferring existing calibrations to Bruker instruments
- Application support for developing your own calibrations
- [Offer INGOT calibration for feeds and feed ingredients](#)

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